Serial Number: 10/815,564 Filing Date: March 31, 2004

Title: CAPILLARY UNDERFILL CHANNEL

## **IN THE CLAIMS**

Please amend the claims as follows:

- (Currently Amended) A package comprising:

   a die including an active surface;
   a substrate electrically coupled with the active surface; and
   an interposer between the die and the substrate, wherein the interposer has a body
   with a first surface, an opposite second surface, and a <u>fluid</u> channel passing through the
   body from the first surface to the second surface.
- 2. (Currently Amended) The package of claim 1 wherein the first surface is adapted to receive the die on a die receiving portion thereof, wherein the die receiving portion includes an outline defining a die shadow region in a direction from the first surface to the second surface, wherein the <u>fluid</u> channel lies in the die shadow region.
- 3. (Currently Amended) The package of claim 2 wherein the <u>fluid</u> channel <u>includes</u> [[is]] a vent hole to facilitate capillary flow of underfill mixture dispensed between the interposer and the substrate.
- 4. (Currently Amended) The package of claim 3 wherein underfill mixture [[is]] dispensed between the interposer and the substrate <u>includes</u>, wherein a meniscus of the underfill mixture is formed within the vent hole, and the meniscus substantially prevents the underfill from exiting the first surface of the interposer.
- 5. (Currently Amended) The package of claim 1 wherein the <u>fluid</u> channel lies outside of a die shadow region.
- 6. (Currently Amended) The package of claim 5 wherein the <u>fluid</u> channel <u>includes</u> [[is]] a microchannel through which underfill is dispensed.

Title: CAPILLARY UNDERFILL CHANNEL

Dkt: 884.C18US1

- (Currently Amended) The package of claim 1 wherein there are at least two fluid 7. channels formed in the interposer.
- (Currently Amended) The package of claim 7 wherein the at least two fluid 8. channels in the interposer includes a vent hole within a die shadow region and a microchannel that lies outside of the die shadow region, wherein underfill is dispensed into the microchannel and between the interposer and substrate.
- 9. (Currently Amended) A packaging system comprising: a die;
  - a substrate electrically coupled with the die;

an interposer between the die and the substrate, wherein the interposer has a body with a first surface, an opposite second surface, and a <u>fluid</u> channel passing through the body from the first surface to the second surface; and

underfill mixture dispensed between the interposer and the substrate using capillary flow.

- 10. (Currently Amended) The packaging system of claim 9 wherein the <u>fluid</u> channel is substantially centered in the interposer.
- (Currently Amended) The packaging system of claim 9 wherein the <u>fluid</u> channel 11. includes [[is]] a vent hole within a die shadow region to facilitate capillary flow of the underfill mixture dispensed between the interposer and the substrate.
- (Currently Amended) The packaging system of claim 9 wherein the <u>fluid</u> channel 12. lies outside of a die shadow region, wherein the die shadow region extends from an active surface of the die through the interposer to the second surface.
- 13. (Cancelled)

Serial Number: 10/815,564 Filing Date: March 31, 2004

Title: CAPILLARY UNDERFILL CHANNEL

Dkt: 884.C18US1

14. (Currently Amended) The packaging system of claim 9 wherein there are at least two fluid channels formed in the interposer, including a channel within a die shadow region, and a channel that lies outside of the die shadow region.

15. (Withdrawn) A process comprising:

forming a channel through a channel body from a first surface of an interposer through to an opposite second surface of the interposer;

disposing the interposer between a die and a substrate; and

dispensing underfill between the interposer and the substrate, wherein the channel is at least one of a vent hole to facilitate capillary flow of the underfill mixture, and a microchannel through which the underfill mixture is dispensed.

- 16. (Withdrawn) The process of claim 15 wherein air escapes from between the interposer and the substrate through the vent hole as the underfill mixture is dispensed.
- 17. (Withdrawn) The process of claim 15 wherein the vent hole is substantially centered in the interposer.
- 18. (Withdrawn) The process of claim 15 wherein the microchannel lies outside of a die shadow region.
- 19. (Withdrawn) The process of claim 18 further comprising positioning an underfill dispenser nozzle to the first surface of the interposer at the channel.
- (Withdrawn) The process of claim 19 further comprising positioning an underfill 20. dispenser nozzle adjacent an outer edge of the die to dispense the underfill mixture in the channel.

Serial Number: 10/815,564 Filing Date: March 31, 2004

Title: CAPILLARY UNDERFILL CHANNEL

Dkt: 884.C18US1

- 21. (Withdrawn) The process of claim 15 further comprising positioning the vent hole within a die shadow region, and positioning an underfill dispenser nozzle adjacent an outer edge of the die to dispense the underfill mixture through the microchannel and between the interposer and the substrate.
- 22. (Withdrawn) The process of claim 15 further comprising dispensing the underfill mixture from a plurality of underfill mixture dispensers substantially simultaneously while allowing air to escape from between the substrate and the interposer via the vent hole.
- 23. (Withdrawn) The process of claim 22 further comprising forming a plurality of microchannels in the interposer about the die, wherein the plurality of dispensers are positioned at the plurality of microchannels, respectively, to dispense the underfill mixture.
- 24. (New) The packaging system of claim 9 wherein the fluid channel includes a microchannel through which the underfill mixture is dispensed.